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(54) RESIN COMPOSITION FOR ELECTROPHOTOGRAPHIC TONER, ELECTROPHOTOGRAPHIC TONER AND ITS PRODUCTION

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a resin compsn. for an electrophotographic toner not causing the deterioration of hue to color stain, ensuring stable electrostatic chargeability of the toner, having satisfactory fixing strength and fit for flash fixation and, production of an electrophotographic toner.
SOLUTION: This resin compsn. contains at least a bonding resin and at least one kind of IR absorbing inorg. compd. as an IR absorber. The inorg. compd. is selected from among a metal oxide-base material (a) obtd. by incorporating a tetravalent metallic atom and/or F into indium oxide, a metal oxide- base material (b) obtd. by incorporating a pentavalent metallic atom and/or F into tin oxide, a metal oxide-base material (c) obtd. by incorporating at least one among a group IIIb metallic atom, a group IVb metallic atom, a trivalent metallic atom, a tetravalent metallic atom, F and C into zinc oxide and cadmium stannate (d).

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CLAIMS

[Claim(s)]

[Claim 1] In the resin constituent for toners for electrophotography which contains a binding resin and an infrared-absorption agent at least The metallic-oxide system matter which comes to contain (IV ****** atom and/or F) in indium oxide as the aforementioned infrared-absorption agent (a), The metallic-oxide system matter which comes to contain (V ****** atom and/or F) in tin oxide (b), a zinc oxide (a III B group metal atom, an IVB group metal atom, and an III ****** atom --) The metallic-oxide system matter (c) which comes to contain IV ****** atom and at least one atom in F and C, and the resin constituent for toners for electrophotography characterized by containing at least one infrared-absorption nature inorganic compound in stannic-acid cadmium NIUMU (d).

[Claim 2] The resin constituent for toners according to claim 1 for electrophotography whose infrared-absorption nature inorganic compound is the zinc-oxide system particle which uses at least one alloying element in a III B group metal atom and an IVB group metal atom, and zinc as a metal component, and which makes a main constituent the metallic-oxide coprecipitation object in which zinc-oxide crystallinity is shown in terms of X diffraction study at least.

[Claim 3] In the toner for electrophotography which contains a binding resin, a coloring agent, and an infrared-absorption agent at least The metallic-oxide system matter which comes to contain (IV ****** atom and/or F) in indium oxide as the aforementioned infrared-absorption agent (a), The metallic-oxide system matter which comes to contain (V ****** atom and/or F) in tin oxide (b), a zinc oxide (a III B group metal atom, an IVB group metal atom, and an III ****** atom --) The toner for electrophotography characterized by containing the metallic-oxide system matter (c) which comes to contain IV ****** atom and at least one atom in F and C, and at least one infrared-absorption nature inorganic compound in stannic-acid cadmium NIUMU (d).

[Claim 4] The toner for electrophotography according to claim 3 which is a color toner which contains coloring agents other than black as a coloring agent.

[Claim 5] The toner for electrophotography according to claim 3 or 4 which is an object for flash plate fixing.

[Claim 6] The metallic-oxide system matter which comes to contain (IV ****** atom and/or F) to a binding resin at indium oxide (a), The metallic-oxide system matter which comes to contain (V ****** atom and/or F) in tin oxide (b), a zinc oxide (a III B group metal atom, an IVB group metal atom, and an III ****** atom --) The manufacture method of the toner for electrophotography characterized by distributing the metallic-oxide system matter (c) which comes to contain IV ****** atom and at least one atom in F and C, at least one infrared-absorption nature inorganic compound in stannic-acid cadmium NIUMU (d), and a coloring agent.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the resin constituent for toners for electrophotography used in fields, such as electrophotography and electrostatic recording, the toner for electrophotography, and its manufacture method. Furthermore, a fixing method is related with the resin constituent for toners effective in the equipment which is a flash plate for electrophotography, the toner for electrophotography, and its manufacture method in detail.
[0002]
[Description of the Prior Art] As a picture fixing method to the printed matter-ed in the copying machine by the xerography, or a printer, a hot calender roll, pressure fixing, solvent fixing, optical fixing, etc. are known. Typical flash plate fixing of optical fixing in these fixing methods is a method established according to the flash of the discharge tubes, such as a xenon flash tube. Flash plate fixing is a fixing method with the feature which was [ignite / since it is (1) non-contact fixing, even if it gets the recording paper blocked in (3) fixing inside of a plane which can be established regardless of the quality of the material of the printed matter-ed / (2) / to which resolution of a picture is not reduced at the time of fixing, and thickness] excellent.
[0003] As a toner for electrophotography used for flash plate fixing, the technology (JP,56-301395,A) which used the epoxy resin as a binding resin and used carbon black and the color as a coloring agent, and the technology (JP,2-71276,A) which used carbon black as polyester resin or an epoxy resin, and a coloring agent as a binding resin are known.
[0004]
[Problem(s) to be Solved by the Invention] A coloring agent absorbs the light energy of an infrared region with the strong luminescence intensity of a xenon flash tube, they change it into heat energy, and these toners for flash plate fixing electrophotography go up, and temperature carries out softening fusion and is fixing them to printed matter-ed. Although absorption of a visible region has coloring agents other than black, absorption of an infrared region is weak. Moreover, since a charge control agent also has weak absorption of an infrared region, in a color toner, fixing sufficient by the flash plate fixing method is not obtained.
[0005] Moreover, in a black toner, although the black color material which is a coloring agent also absorbs a near infrared region comparatively well, it is in the state which cannot be said that an absorbed energy is still enough. If it doubles the melting point of a binding resin with this absorption level, this melting point will become lowness. A toner comrade causes blocking in ordinary temperature, or a toner sticks on a carrier. degrade a developer or If this melting point is made high in order for the fault which generates the toner filming phenomenon which a toner is [a phenomenon] sticky and attaches on a photoconductivity insulation body whorl to arise and to avoid this fault It is because the fault which poor fixing generates in the second half of the life of a portion with the weak luminescence intensity of a xenon flash tube or this lamp arises.
[0006] Although adding an infrared-absorption agent to a toner is proposed by JP,63-161460,A as a method of solving such a problem, the indication of the concrete matter is not made. As a well-known infrared-absorption agent, although there are an anthraquinone system compound, an aminium system compound, a poly methine system compound, a G MONIUMU system compound, a cyanine system compound, etc., these organic compounds have absorption alternative to a light field not a little, and are coloring it brown, a copper rust color, blue black, etc. Therefore, it was remarkable in especially the color toner, and there was a problem whose color tone of a toner falls by color contamination of an infrared-absorption agent and which cannot obtain the printed matter of a clear color tone.
[0007] Although JP,7-271801,A is related with the toner for heat roller fixing, adding to a toner the infrared-absorption matter which does not have optical-absorption nature in a light field is indicated. The textile-glass-yarn powder

material which makes 5 oxidization 2 Lynn a principal component, and specifically contains an iron oxide and/or a copper oxide is indicated. This powder material has the trouble that the printing concentration of printed matter-ed will become thin as the time of what can solve the aforementioned problem in that the color tone of a toner is not reduced passes. Since this has the high resistance of this infrared-absorption matter, it is because the amount of electrifications of a toner increases with time and an electrostatic imprint is no longer performed good.

[0008] Therefore, the technical problem of this invention does not have the color tone fall by color contamination, and is to offer the resin constituent for toners for electrophotography suitable for flash plate fixing whose electrification nature of a toner has sufficient fixing intensity stably, the toner for electrophotography, and its manufacture method.

[0009]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the resin constituent for toners for electrophotography concerning this invention In the resin constituent for toners for electrophotography which contains a binding resin and an infrared-absorption agent at least The metallic-oxide system matter which comes to contain (IV ****** atom and/or F) in indium oxide as the aforementioned infrared-absorption agent (a), The metallic-oxide system matter which comes to contain (V ****** atom and/or F) in tin oxide (b), a zinc oxide (an IIIB group metal atom, an IVB group metal atom, and an III ****** atom --) It is characterized by containing the metallic-oxide system matter (c) which comes to contain IV ****** atom and at least one atom in F and C, and at least one infrared-absorption nature inorganic compound in stannic-acid cadmium NIUMU (d).

[0010] Moreover, the toner for electrophotography concerning this invention is set to the toner for electrophotography which contains a binding resin, a coloring agent, and an infrared-absorption agent at least. The metallic-oxide system matter which comes to contain (IV ****** atom and/or F) in indium oxide as the aforementioned infrared-absorption agent (a), The metallic-oxide system matter which comes to contain (V ****** atom and/or F) in tin oxide (b), a zinc oxide (a III B group metal atom, an IVB group metal atom, and an III ****** atom --) It is characterized by containing the metallic-oxide system matter (c) which comes to contain IV ****** atom and at least one atom in F and C, and at least one infrared-absorption nature inorganic compound in stannic-acid cadmium NIUMU (d).

[0011] Moreover, the manufacture method of the toner for electrophotography concerning this invention The metallic-oxide system matter which comes to contain (IV ****** atom and/or F) to a binding resin at indium oxide (a), The metallic-oxide system matter which comes to contain (V ****** atom and/or F) in tin oxide (b), a zinc oxide (a III B group metal atom, an IVB group metal atom, and an III ****** atom --) It is characterized by distributing the metallic-oxide system matter (c) which comes to contain IV ****** atom and at least one atom in F and C, at least one infrared-absorption nature inorganic compound in stannic-acid cadmium NIUMU (d), and a coloring agent.

[0012] In this invention, since the infrared-absorption nature inorganic compound which consists of specific metallic-oxide system matter at least as an infrared-absorption agent is used, there is no color tone fall by color contamination, and the resin constituent for toners for electrophotography suitable for flash plate fixing whose electrification nature of a toner has sufficient fixing intensity stably, and the toner for electrophotography can be obtained. Although the principle is unknown, this infrared-absorption nature inorganic compound absorbs infrared radiation efficiently, and is considered because the light is hardly absorbed and it has moderate conductivity.

[0013] In this invention, although the resin constituent for toners for electrophotography became a final product as a resin for toners, it also means the middle article which does not contain the various additives added others and if needed. Similarly, although the toner for electrophotography became a final product as a toner, it means the middle article which does not contain the various additives added others and if needed.

[0014] As for an infrared-absorption nature inorganic compound, in the resin constituent for toners for electrophotography concerning this invention, it is desirable that it is the zinc-oxide system particle which uses at least one atom in a III B group metal atom and an IVB group metal atom and zinc as a metal component and which makes a main constituent the metallic-oxide coprecipitation object in which zinc-oxide crystallinity is shown in terms of X diffraction study at least.

[0015] As for the toner for electrophotography concerning this invention, it is desirable that it is the color toner which contains coloring agents other than black as a coloring agent. As for the toner for electrophotography concerning this invention, it is desirable that it is an object for flash plate fixing.

[0016]

[Embodiments of the Invention] The resin constituent for toners for electrophotography concerning this invention contains a binding resin at least. As a binding resin, resins, such as a styrene resin, a styrene acrylic resin, a polyester system resin, an epoxy system resin, a polyamide system resin, a phenol system resin, a hydrocarbon system resin, and a petroleum system resin, can be mentioned. these resins are independent -- or you may mix You may use the resin and additive of further others together.

[0017] this invention is characterized by containing a specific infrared-absorption nature inorganic compound as an infrared-absorption agent in the resin constituent for toners for electrophotography. The metallic-oxide system matter with which this infrared-absorption nature inorganic compound comes to contain (IV ****** atom and/or F) in indium oxide (a), The metallic-oxide system matter which comes to contain (V ****** atom and/or F) in tin oxide (b), It is at least one of the metallic-oxide system matter (c) which comes to contain (a III B group metal atom, an IVB group metal atom, an III ****** atom, IV ****** atom, and at least one atom in F and C) in a zinc oxide, and stannic-acid cadmium NIUMU (d). Two or more sorts may be used together and these infrared-absorption nature inorganic compounds may be used, even if independent.

[0018] Mixture, a coprecipitation object, the doped thing are contained as a form of content. As metallic-oxide system matter (a) which comes to contain (IV ****** atom and/or F) in indium oxide, the thing containing the tin which is IV ****** atom is mentioned to indium oxide. It is desirable that it is [of the content in this metallic-oxide system matter] 0.1 to 20 atom % comparatively (the contained atom/indium).

[0019] As metallic-oxide system matter (b) which comes to contain (V ****** atom and/or F) in tin oxide, the thing containing the antimony which is V ****** atom is mentioned to tin oxide. It is desirable that it is [of the content in this metallic-oxide system matter] 0.1 to 20 atom % comparatively (the contained atom/tin). a zinc oxide (a III B group metal atom, an IVB group metal atom, and an III ****** atom --) As metallic-oxide system matter (c) which comes to contain IV ****** atom and at least one atom in F and C aluminum, Ga, In and Tl which are a III B group metal atom at a zinc oxide, and Si, germanium, Sn, Pb and III which are an IVB group metal atom The thing containing Ti, V, Cr, Mn, Fe, Co, Zr, Hf, and La which are the metal atom of ** and/or IV ** is mentioned. It is desirable that it is [of the content in this metallic-oxide system matter] 0.1 to 20 atom % comparatively (the contained atom/zinc).

[0020] The zinc-oxide system particle which uses at least one atom in a III B group metal atom and an IVB group metal atom and zinc as a metal component at the point that the dispersibility to a constituent is high and which makes a main constituent the metallic-oxide coprecipitation object in which zinc-oxide crystallinity is shown in terms of X diffraction study at least is desirable among these metallic-oxide system matter. As an alloying element, an indium and/or aluminum are desirable.

[0021] As for the particle size of an infrared-absorption nature inorganic compound, it is desirable that it is 1 micrometer or less from the point of not affecting substantially the hue of the constituent obtained when a transparent feeling is high and it adds to a constituent, and the point of the absorption efficiency of infrared radiation. 0.5 micrometers or less are 0.1 micrometers or less still more preferably more preferably. In the case of the above-mentioned zinc-oxide system particle, in order to demonstrate infrared-absorption nature effectively, it is desirable that it is 0.1 micrometers or less.

[0022] Although an example of the way particle size manufactures a thing 0.1 micrometers or less by the above-mentioned zinc-oxide system particle is explained, this invention is not limited to this. In order to manufacture this zinc-oxide system particle, the mixture (m) which dissolves or distributes and comes the source of zinc, and a monocarboxylic acid into the medium which consists of alcohol at least The compound containing at least one sort of alloying elements (below, it may be called "a metal (M)") chosen from from among the groups which consist of a III B group metallic element and an IVB group metallic element (this compound is a concept also containing metals, such as a metal simple substance and an alloy.) Below, the zinc-oxide system particle which consists of a crystalline coprecipitate of the metallic oxide containing 80 - 99.9% of zinc and (Metal M) 0.1-20% by the ratio of the atomic number to the total atomic number of a metallic element is deposited by holding in temperature of 100 degrees C or more under the coexistence which may be called "metal (M) compound."

[0023] The aforementioned source of zinc is converted into a crystalline zinc oxide in X diffraction study by heating the mixture (m) containing a monocarboxylic acid and alcohol, and at this time, when a metal (M) compound lives together in a medium, the dispersing element containing this zinc-oxide system particle is obtained. If at least one of three components of the aforementioned source of zinc, the aforementioned monocarboxylic acid, and the aforementioned alcohol is then missing as a starting material, the deposit reaction of a zinc-oxide crystal will not occur, and unless a metal (M) exists, this zinc-oxide system particle is not obtained.

[0024] The infrared-absorption nature inorganic compound in this invention may be processed by the resin in the front face. A composite particle with the polymer which has at least one polar atomic group chosen from the group which becomes at least one principal chain chosen from the group which consists of acrylic (meta), a styrene system, vinyl systems, these copolymerization systems, an alkyd system, a polyester system, and a polyamide system as such a resin from a carboxyl group, the amino group, an amide group, a silanol group, and an alkoxy silyl machine, or polysiloxane machine content polymer, or a surface ornamentation particle is mentioned.

[0025] The absorptivity of the infrared radiation of an infrared-absorption nature inorganic compound and a visible ray can be measured as follows. This inorganic compound is made into an addition part handbill film, a paint film, or molding at transparent resins, such as acrylic resin, and the permeability of a visible and infrared wavelength field is measured with a spectrophotometer (for example, UV-3100 Shimadzu make). The absorptivity in each field can be checked from the permeability curve in a visible region (400-800nm) and an infrared region (800-2000nm).

[0026] Since infrared-absorption nature is measured with permeability in this invention, the case where this inorganic compound is absorbing infrared radiation truly, and this inorganic compound have the property to reflect infrared radiation, and may be in the state where infrared radiation was absorbed in the whole paint film, as a result on which infrared radiation was scattered in the paint film for the reason. Since the infrared-absorption nature inorganic compound used by this invention has moderate conductivity, it is contributed to manufacture of the electric resistance of a toner. since the volume-resistivity values of the particle of this inorganic compound are 109ohms / below ** grade, it has an effect as a resistance modifier of a toner, and electrification properties, such as a standup of electrification of a toner and the stability of electrification at the time of a running test, are raised -- there is work

[0027] An infrared-absorption nature inorganic compound may be used with what form, may be independently used as a particle, and can also be formed in parent particle front faces, such as sheet metal-like particles, such as a mica and glass, in the shape of a coat. As for the addition of an infrared-absorption nature inorganic compound, it is desirable that it is 0.01 - 50 weight section to the binding resin 100 weight section, and it is more desirable that it is 0.1 - 30 weight section. Fixing that under the 0.01 weight section of the absorption effect of infrared radiation is inadequate and sufficient is not obtained. Moreover, the electric resistance adjustment effect is not enough, either. When 50 weight sections are exceeded, there is a problem that the electric resistance value of a toner falls too much, to an effect not going up so much about fixing.

[0028] There is especially no limit about the time of addition of an infrared-absorption nature inorganic compound. For example, any after composition are sufficient in the middle of the monomer stage before compounding a binding resin, and composition. Two or more sorts may be used together and an infrared-absorption nature inorganic compound may be used, even if independent. As an infrared-absorption agent, it is a book besides the above-mentioned infrared-absorption nature inorganic compound.

[0029] The toner for electrophotography of this invention contains a binder, a coloring agent, and an infrared-absorption agent at least, and contains the above-mentioned infrared-absorption nature inorganic compound as the aforementioned infrared-absorption agent. The above-mentioned thing can be used as a binding resin. A detail, an addition, etc. of an infrared-absorption agent are the same as that of the above-mentioned resin constituent for toners for electrophotography. As a coloring agent, each well-known thing can use it conventionally. For example, black coloring agents, such as carbon black, The chrome yellow, cadmium yellow, a Synthetic Ochre, a Titanium Yellow, chrome yellow, naphthol yellow, A Hansa Yellow, pigment yellow, benzidine yellow, permanent yellow, Yellow coloring agents, such as a quinoline yellow lake and ANSURA pyrimidine yellow, A permanent orange and molybdenum orange, the Balkan Peninsula first orange, Orange coloring agents, such as a benzine orange and an indanthrene brilliant orange, Browning agents, such as an iron oxide, umber, and permanent Brown, red ocher, Rose red ocher, antimony powder, a Permanent Red, fire red, A brilliant carmine, a light fast red toner, permanent carmine, Pyrazolone red, Bordeaux, helio bordeaux, a rhodamine lake, E. I. du Pont de Nemours oil red, thioindigo red, thioindigo MARUN, Red coloring agents, such as Watchung-Red strontium, cobalt purple, first violet, Purple coloring agents, such as dioxazine violet and a Violet Lake, A methylene blue, aniline blue, cobalt blue, cerulean blue, A KARUKO oil blue, a non-metal copper phthalocyanine blue, a copper phthalocyanine blue, Blue coloring agents, such as ultra marine blue, indanthrene blue, and indigo, A pigment or colors, such as a chrome green, a cobalt green, the pigment green B, a green gold, a Phthalocyanine Green, malachite green oxalate, and a poly chromium bromine copper phthalocyanine, can be used. [, such as a green stain agent] In the case of the color toner which used coloring agents other than black, especially this invention has a large effect.

[0030] As for these coloring agents, it is desirable that 3-15 weight section use is carried out to the binding resin 100 weight section. In the toner for electrophotography of this invention, you may use together a polyolefine system wax, a natural wax, etc. further. A charge control agent is classified into a right electrification control agent and a negative electrification control agent, and these have the desirable thing of colorlessness or light color.

[0031] As a polyolefine, although the polymers of olefin monomers, such as ethylene, a propylene, a butene, a pentene, a hexene, a heptene, an octene, a nonene, decene, a 3-methyl-1-butene, a 3-methyl-2-pentene, and a 3-propyl-5-methyl-2-hexene, or these olefin monomers, and a copolymer with an acrylic acid, a methacrylic acid, vinyl acetate, etc. are mentioned, especially polypropylene is desirable. As for these, it is desirable that 0.5-10 weight section combination is carried out to the binding resin 100 weight section, and it is 1 - 5 weight section more preferably. There is an inclination to be inferior to a fixing property, under in the 0.5 weight section. Moreover, since the fluidity of a toner is inferior when 10 weight sections are exceeded, picture quality deteriorates by poor developer flow, or it is easy to generate problems, like material causes stay within the hold container of a toner and a developer.

[0032] To a toner, other compounds can be added further if needed. As other compounds, the lower-alcohol ester of fatty acids, such as a butyl stearate and a stearin acid propyl The polyhydric-alcohol ester of fatty acids, such as a caster wax (product made from Ito Oil Mill), and a diamond wax (New Japan Chemical Co., Ltd. make) Palm aceti (Nippon Oil & Fats Co., Ltd. make), the Hoechst wax E, Hoechst wax - OP (Hoechst acouchi en gesellschaft company make), The higher-alcohol ester of fatty acids, such as carnauba wax, a screw AMAIDO blast flow (Nitto Chemical Industry Co., Ltd. make), AMAIDO 6L, 7S, and 6H (Kawaken Fine Chemicals Co., Ltd. make), Alkylene screw fatty-acid amide compounds, such as the Hoechst wax C (Hoechst acouchi en gesellschaft company make), The weight average molecular weight of NIPPORU NBR, 2057S and 2007J, and BR1220 grade is raised for 50,000 or more diene system resins, a hydroxy-group content vinyl system resin, a carboxyl group content vinyl system resin, etc. These compounds make the duty which tunes the electrification nature and fixing nature of a toner finely, or improves the life of a photo conductor or a toner. As for these compounds, it is desirable to add in the amount below 10 weight sections to the binding resin 100 weight section.

[0033] 2-20 micrometers of mean particle diameters of the toner for electrophotography are 4-10 micrometers more preferably. What is necessary is to be the stage after making the monomer stage of a binding resin, a binding resin, a coloring agent, and other additives into the stage which mixes or kneads, or a toner particle etc., and just to add an infrared-absorption nature inorganic compound using technique, such as fixed processing, if needed, in order to produce the toner for electrophotography concerning this invention. Moreover, you may add a coloring agent and other additives to the resin constituent for toners for electrophotography concerning the above-mentioned this invention. An infrared-absorption nature inorganic compound is used in the state of fine particles, fine dispersion liquid, or a paste etc. As the manufacture method of a toner, both the well-known grinding method and a polymerization method can be used. What is necessary is just to perform a polymerization, where this infrared-absorption nature inorganic compound and a coloring agent are distributed into the mixture of the monomer for compounding a binding resin, when manufacturing by the polymerization method.

[0034] Although it can be used by any fixing methods, such as a well-known hot calender roll, pressure fixing, solvent fixing, and optical fixing, the toner for electrophotography concerning this invention has a large effect, when it uses by optical fixing, especially flash plate fixing. It is mixed with a carrier and the toner for electrophotography concerning this invention can also be used as a two-component system developer. As a carrier, the resin coat carrier which covered with the resin what distributed the impalpable-powder magnetic substance, and the carrier front face is mentioned into ferrite powder or a resin.

[0035]

[Example] Although an example explains this invention to a detail further below, this invention is not limited to this. In an example, especially the "section" shall express the "weight section", as long as there is no notice.

The zinc content solution of a uniform solution was obtained by carrying out a temperature up to 1.8kg of acetic acids, and the mixed solvent of 1.6kg of ion exchange water to 100 degrees C, stirring, after carrying out addition mixture of 0.3kg of zinc-oxide powder, and the 40.0g of the acetic-acid indium 2 hydrates in the glass reactor of 10L equipped with synthetic example 1 agitator, the dropping mouth, the thermometer, and the rotary flow condensator.

[0036] Next, from the exterior, 2-butoxy ethanol 14kg was taught to the agitator, the dropping mouth, the thermometer, and the glass reactor of 20L equipped with the distillate gas outlet which can carry out thermal heating, to 153 degrees C, the heating temperature up of the inside ** was carried out, and it was held. 1.38kg of dispersing elements was obtained by dropping the zinc content solution whole quantity held at 100 degrees C, adding 200g of n-butanol solutions which dissolved 40.0g of lauric acids, carrying out heating maintenance at this temperature further for 5 hours, and performing vacuum concentration to this at this temperature further for 2 hours, when the temperature up of the inside ** is carried out to 168 degrees C after a dropping end. The particle whose mean particle diameter is 18nm distributed the dispersing element by 20% of the weight of concentration. The particle in a dispersing element was a crystalline zinc oxide in X diffraction study, and were 94.5 % of the weight of metallic-oxide contents, and a particle which In becomes from 3.3% of composition by the atomic ratio to a metal atom total amount.

The developer which consists of the evaluation toner 4 section of fixing intensity and the styrene acrylic resin coat ferrite carrier 96 section is set to a copying machine (LEO dry cleaning 7610 (Toshiba make)), and after creating a non-established picture, flash plate fixing was carried out with the energy of 1.5 mJ/cm2 using the xenon flash tube.

[0037] The survival rate of the picture after tape exfoliation was evaluated for this flash plate fixing picture as fixing intensity using the cellophane tape (Scotch whisky mending tape (product made from 3M)). The survival rate of the picture after tape exfoliation measured the picture concentration before and behind tape exfoliation, and computed it by the following formula. The survival rate after tape exfoliation = (after [tape exfoliation] picture concentration) /(front [tape exfoliation] picture concentration) x100 picture concentration was measured using the Macbeth reflection density meter RD514 type (product made from A division kollmorgen Corp).

Example 1 Polyester resin (ATR-2009 Kao make) The 1320 sections Quinacridone system pigment (SHINKASHA red Du Pont make) The 80 sections Infrared-absorption nature inorganic compound The 30 sections (ERUKOMU tangent line30 (SnO2-Sb) catalyst Chemicals particle size of 1 micrometer)

Charge control agent (kaya charge N-4 Nippon Kayaku make) The 20 sections Wax (made in screw call 550P 3 ** Chemicals) After putting in block the toner constituent of the 50 sections above and carrying out preliminary mixture by the Henschel mixer, melting kneading was carried out by 2 shaft EKUSURUDA. Subsequently, crushing of the cooled mixture was carried out by the pin mill, and it pulverized by JIEMMIRU, it classified with the pneumatic elutriation machine, and the red toner 1 was obtained.

[0038] As a result of measuring the particle diameter of this red toner 1 with the coal tar multi-soda pop II (coal tar company make), the weighted-mean particle diameter was 7.5 micrometers. As a result of evaluating this red toner 1 according to the evaluation method of fixing intensity, it was the picture of 90% and good fixing intensity. Moreover, the acquired picture was the thing of the good quality of image of a clear color tone without fogging.

[0039] as a result of [of 1000 more sheets] testing by carrying out continuation picture appearance, problems, such as poor electrification, did not occur as a result of carrying out continuation picture appearance and measuring the amount of electrifications of each developer of order by the ISU part announcer rider (Hosokawa Micron make), the front was [the back] 22.0microc/g in 23.0microc/g

Example 2 Styrene . Section [850 /] N-Butyl Acrylate 150 Sections Divinylbenzene Three Sections Quinacridone System Pigment (SHINKASHA Red Du Pont Make) 60 Sections Infrared-Absorption Nature Inorganic Compound 23 Sections (made in ERUKORUMU Tangent Line30 (SnO2-Sb) Catalyst Chemicals)

Charge control agent (kaya charge N-4 Nippon Kayaku make) The 15 sections ABNR (product made from Japanese Hydrazine Industry) The 20 sections ABNV (product made from Japanese Hydrazine Industry) Distributed processing of the 40 section above-mentioned polymerization nature monomer constituent was carried out by DYNO-MILL KDL (product made from Willy A.Bachofen AGMaschinenfabrik). It supplied to 4800g of water containing 0.04% of sodium dodecylbenzenesulfonate and 4% of calcium phosphate which were beforehand prepared in these polymerization nature monomer constituent dispersion liquid, the two pass was carried out by EBARAMAIRUDA (Ebara Make) 1500rpm, and suspension was obtained. The temperature up was carried out to the grade to which a polymerization particle does not sediment this suspension under nitrogen-gas-atmosphere mind, carrying out uniform stirring of the whole, and the polymerization was performed at 75 degrees C for 6 hours.

[0040] As a result of measuring the particle diameter of this suspension-polymerization particle like an example 1, the weighted-mean particle diameter was 6.2 micrometers. Subsequently, it cooled to ordinary temperature, and after carrying out by having repeated solid liquid separation and washing and washing enough after dissolving calcium phosphate with a hydrochloric acid, it dried by the 60-degree C hot air drying equipment for 24 hours, and the red toner 2 was obtained.

[0041] As a result of evaluating this red toner 2 according to the evaluation method of fixing intensity like an example 1, it was the picture of 89% and good fixing intensity. Moreover, the acquired picture was the thing of the good quality of image of a clear color tone without fogging. as a result of [of 1000 more sheets] testing by carrying out continuation picture appearance, problems, such as poor electrification, did not occur as a result of carrying out continuation picture appearance and measuring the amount of electrifications of each developer of order like an example 1, the front was [the back] 18.8microc/g in 20.4microc/g

The red toner 3 was obtained by the same method as an example 1 except changing the infrared-absorption nature inorganic compound of example 3 example 1 to the zinc-oxide particle (ZnO-In) dispersion-liquid 150 section obtained in the synthetic example 1.

[0042] As a result of measuring the particle diameter of this red toner 3 like an example 1, the weighted-mean particle diameter was 7.0 micrometers. As a result of evaluating this red toner 3 according to the evaluation method of fixing intensity like an example 1, it was the picture of 95% and good fixing intensity. Moreover, the acquired picture was the thing of the good quality of image of a clear color tone without fogging.

[0043] as a result of [of 1000 more sheets] testing by carrying out continuation picture appearance, problems, such as poor electrification, did not occur as a result of carrying out continuation picture appearance and measuring the amount of electrifications of each developer of order like an example 1, the front was [the back] 25.5microc/g in 25.0microc/g

The red toner 1 for comparison was obtained by the same method as an example 1 except not adding the infrared-absorption nature inorganic compound of example of comparison 1 example 1.

[0044] As a result of measuring the particle diameter of this red toner 1 for comparison like an example 1, the weighted-mean particle diameter was 7.8 micrometers. As a result of evaluating this red toner 1 for comparison according to the evaluation method of fixing intensity like an example 1, the thing of fixing intensity sufficient at 45%

was not obtained. Moreover, although the acquired picture had the clear color tone, it was quality of image with low level with fogging.
[0045] as a result of [of 1000 more sheets] testing by carrying out continuation picture appearance, it was admitted that picture concentration was not stabilized but it fell gradually as a result of carrying out continuation picture appearance and measuring the amount of electrifications of each developer of order like an example 1, the rise of 45.0microc/g and the amount of electrifications was accepted [the front] for the back by 23.0microc/g
The red toner 2 for comparison was obtained by the same method as an example 1 except making the infrared-absorption nature inorganic compound of example of comparison 2 example 1 into a well-known infrared-absorption agent (kaya SOBU inter-record-gap002 Nippon Kayaku make).
[0046] As a result of measuring the particle diameter of this red toner 2 for comparison like an example 1, the weighted-mean particle diameter was 7.6 micrometers. As a result of evaluating this red toner 2 for comparison according to the evaluation method of fixing intensity like an example 1, although 70% was not enough, it was the thing of appropriate fixing intensity. Moreover, the acquired picture was the indistinct color tone which the color contamination by the infrared-absorption agent was accepted, and wore the black tint, and was the low quality of image of level with fogging.
[0047] as a result of [of 1000 more sheets] testing by carrying out continuation picture appearance, it was admitted that picture concentration was not stabilized but it fell gradually as a result of carrying out continuation picture appearance and measuring the amount of electrifications of each developer of order like an example 1, elevation of 41.0microc/g and the amount of electrifications was accepted [the front] for the back by 20.5microc/g
[0048]
[Effect of the Invention] According to this invention, there is no color tone fall by color contamination, and the resin constituent for toners for electrophotography suitable for flash plate fixing whose electrification nature of a toner has sufficient fixing intensity stably, the toner for electrophotography, and its manufacture method can be offered.

[Translation done.]